

reduced influent wastewater flows and higher concentrations of some constituents, such as EC and ammonia. If this trend continues, the Discharger has estimated effluent concentrations will exceed the current performance-based effluent limitations.

2. Special Studies and Additional Monitoring Requirements

- a. **Chronic Whole Effluent Toxicity Requirements.** The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at page III-8.00.) As discussed in section IV.C.5 of this Fact Sheet, the discharge has reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan's narrative toxicity objective.

The Monitoring and Reporting Program of this Order requires chronic WET monitoring for demonstration of compliance with the narrative toxicity objective. In addition to WET monitoring, this provision includes a numeric toxicity monitoring trigger, requirements for accelerated monitoring, and requirements for TRE initiation if toxicity is demonstrated.

Monitoring Trigger. This Order includes Discharge Prohibition III.F that prohibits the discharge unless there is at least a 14:1 flow ratio (river-to-effluent). Considering this prohibition, the chronic toxicity trigger from previous Orders 5-00-188 and R5-2010-0114-04 has been carried forward to this Order. The numeric toxicity monitoring trigger to initiate a toxicity reduction evaluation (TRE) is 8 chronic toxicity units or TUC based on the no observed effect concentration (NOEC)¹, i.e., where $8 \text{ TUC} = 100/\text{NOEC}$. The monitoring trigger is not an effluent limitation; it is the toxicity threshold at which the Discharger is required to begin accelerated monitoring and initiate a TRE.

Accelerated Monitoring. The provision requires accelerated WET testing when a regular WET test result exceeds the monitoring trigger. The purpose of accelerated monitoring is to determine, in an expedient manner, whether there is toxicity before requiring the implementation of a TRE. Due to possible seasonality of the toxicity, the accelerated monitoring should be performed in a timely manner, preferably taking no more than 2 to 3 months to complete.

The provision requires accelerated monitoring consisting of four chronic toxicity tests in a six-week period (i.e., one test every two weeks) using the species that exhibited toxicity. Guidance regarding accelerated monitoring and TRE initiation is provided in the *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, March 1991 (TSD). The TSD at page 118 states, "*EPA recommends if toxicity is repeatedly or periodically present at levels above effluent limits more than 20 percent of the time, a TRE should be required.*" Therefore, four accelerated monitoring tests are required in this provision. If no toxicity is demonstrated in the four accelerated tests, then it demonstrates that toxicity is not present at levels above the monitoring trigger more than 20 percent of the time (only 1 of 5 tests are toxic, including the initial test). However, notwithstanding the accelerated monitoring results, if there is adequate evidence of effluent toxicity (i.e.

¹ The No-Observed-Effect-Concentration (NOEC) is the highest concentration of effluent in the receiving water to which organisms are exposed that causes no observable adverse effects on the test organisms (i.e., the highest concentration in which the values for the observed responses are not statistically significantly different from the control).

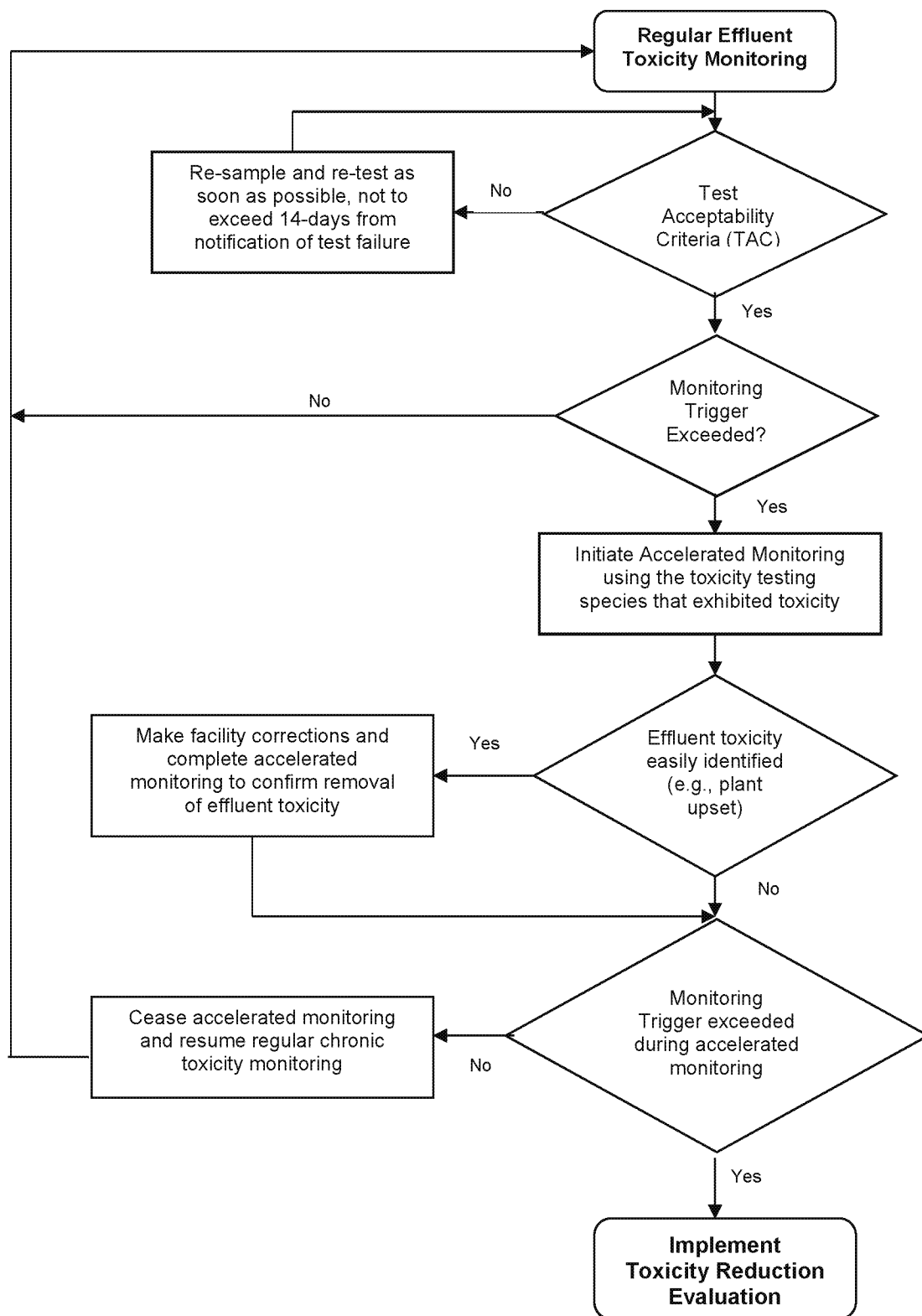
toxicity present exceeding the monitoring trigger more than 20 percent of the time), the Executive Officer may require that the Discharger initiate a TRE.

See the WET Accelerated Monitoring Flow Chart (Figure F-3), below, for further clarification of the accelerated monitoring requirements and for the decision points for determining the need for TRE initiation.

TRE Guidance. The Discharger is required to prepare a TRE Workplan in accordance with U.S. EPA guidance. Numerous guidance documents are available, as identified below:

- i. *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*, EPA/833-B-99/002, August 1999.
- ii. *Generalized Methodology for Conducting Industrial Toxicity Reduction Evaluations (TREs)*, EPA/600/2-88/070, April 1989.
- iii. *Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures, Second Edition*, EPA 600/6-91/003, February 1991.
- iv. *Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I*, EPA/600/6-91/005F, May 1992.
- v. *Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition*, EPA/600/R-92/080, September 1993.
- vi. *Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity, Second Edition*, EPA 600/R-92/081, September 1993.
- vii. *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition*, EPA-821-R-02-012, October 2002.
- viii. *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition*, EPA-821-R-02-013, October 2002.
- ix. *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, March 1991.

Figure F-3
WET Accelerated Monitoring Flow Chart



- b. **Filtration Operations Study.** After a sufficient degree of operational experience following commencement of operation of filtration facilities as designed, built and operated, including at least 3 years of circumstances described in the Future Facility description in Section II.A.2 of the Fact Sheet where some BNR effluent does not receive filtration, a study of November-April performance of the filtration and disinfection system will be required of the Discharger. The study, to be conducted at a time determined by the Central Valley Water Board, will summarize data including the amount (on a daily basis and annual basis) of effluent that did not receive filtration, influent and effluent flows, filter effluent turbidity, filter loading rates, effluent *Giardia* and *Cryptosporidium* data, and effluent *E. coli* and total coliform data.
- c. **Phase 1 Methylmercury Control Study.** The Basin Plan's Delta Mercury Control Program requires NPDES dischargers, working with other stakeholders, to conduct methylmercury control studies (Control Studies) to evaluate existing control methods and, as needed, develop additional control methods that could be implemented to achieve their methylmercury load and waste load allocations. Control studies can be developed through a stakeholder group approach or other collaborative mechanism, or by individual dischargers. The Discharger has agreed to participate in the Central Valley Clean Water Association (CVCWA) Coordinated Methylmercury Control Study (Study).

The Central Valley Water Board will use the Phase 1 Control Studies' results and other information to consider amendments to the Delta Mercury Control Program during the Phase 1 Delta Mercury Control Program Review. The objective of the Control Studies is to evaluate existing control methods and, as needed, develop additional control methods that could be implemented to achieve the methylmercury load and wasteload allocations. In accordance with the Delta Mercury Control Plan, a work plan was submitted on 20 April 2013 by CVCWA on behalf of a group of POTW's in the region. The Central Valley Water Board commits to supporting an adaptive management approach. The adaptive management approach includes the formation of a Stakeholder Group(s) and a Technical Advisory Committee (TAC).

The Study shall evaluate the feasibility of reducing sources more than the minimum amount needed to achieve the methylmercury allocation. The Study also may include an evaluation of innovative actions, watershed approaches, offsets projects, and other short and long-term actions that result in reducing inorganic (total) mercury and methylmercury to address the accumulation of methylmercury in fish tissue and to reduce methylmercury exposure. The Study may evaluate the effectiveness of using inorganic (total) mercury controls to control methylmercury discharges. The Study shall include a description of methylmercury and/or inorganic (total) mercury management practices identified in Phase 1; an evaluation of the effectiveness; and costs, potential environmental effects, and overall feasibility of the control actions. The Study shall also include proposed implementation plans and schedules to comply with methylmercury allocations as soon as possible. The Study shall be submitted by **20 October 2018**.

The Executive Officer may authorize extending the Study due date. The Executive Officer may, after public notice, extend the due date up to 2 years if the Discharger demonstrates it is making significant progress towards developing, implementing and/or completing the Study and reasonable attempts have been made to secure funding for the Study, but the Discharger has experienced severe budget shortfalls.

- d. **Emergency Storage Basin Cleaning and Isolation System Study and Standard Operating Procedures.** Upon upgrades to the emergency storage basins, the Discharger proposes to use the basins for multiple uses, including storage and treatment of non-final wastewater (e.g., untreated or partially-treated wastewater) and final treated wastewater. The proposed multiple use basins have been designed with a double block and bleed system and monitoring system to ensure water does not unintentionally transfer between basins. Furthermore, a high pressure cleaning system will be used after the basins store non-final wastewater. This Order requires the Discharger to conduct a study and/or monitoring to demonstrate the emergency storage basin cleaning and isolation systems will not allow for wastewater pathogens to be reintroduced to the final effluent following the prior use of the emergency storage basins for non-final (e.g., untreated or partially-treated wastewater). This Order also requires the Discharger to develop standard operating procedures for use and cleaning of the emergency storage basins. Upon Executive Officer approval of the final study results and standard operating procedures, the Discharger may discontinue effluent monitoring for BOD₅, TSS, and total coliform organisms at Monitoring Location EFF-001 and monitor for these constituents at Monitoring Location TER-001.

3. Best Management Practices and Pollution Prevention

- a. **Water Code Section 13263.3(d)(3) Pollution Prevention Plans.** A pollution prevention plan for mercury is required in this Order per Water Code section 13263.3(d)(1)(C). Order R5-2010-0114-04 required the Discharger to implement a PPP for mercury and the requirement is retained in this Order. The PPP required in section VI.C.3.a and VI.C.7.c of this Order, shall, at a minimum, meet the requirements outlined in Water Code section 13263.3(d)(3). The minimum requirements for the pollution prevention plans include the following:
 - i. An estimate of all of the sources of a pollutant contributing, or potentially contributing, to the loadings of a pollutant in the treatment plant influent.
 - ii. An analysis of the methods that could be used to prevent the discharge of the pollutants into the Facility, including application of local limits to industrial or commercial dischargers regarding pollution prevention techniques, public education and outreach, or other innovative and alternative approaches to reduce discharges of the pollutant to the Facility. The analysis also shall identify sources, or potential sources, not within the ability or authority of the Discharger to control, such as pollutants in the potable water supply, airborne pollutants, pharmaceuticals, or pesticides, and estimate the magnitude of those sources, to the extent feasible.
 - iii. An estimate of load reductions that may be attained through the methods identified in subparagraph ii.
 - iv. A plan for monitoring the results of the pollution prevention program.
 - v. A description of the tasks, cost, and time required to investigate and implement various elements in the pollution prevention plan.
 - vi. A statement of the Discharger's pollution prevention goals and strategies, including priorities for short-term and long-term action, and a description of the Discharger's intended pollution prevention activities for the immediate future.
 - vii. A description of the Discharger's existing pollution prevention programs.

- viii. An analysis, to the extent feasible, of any adverse environmental impacts, including cross-media impacts or substitute chemicals that may result from the implementation of the pollution prevention program.
- ix. An analysis, to the extent feasible, of the costs and benefits that may be incurred to implement the pollution prevention program.

b. **Mercury Exposure Reduction Program.** The Basin Plan's Delta Mercury Control Program requires dischargers to participate in a Mercury Exposure Reduction Program. The Exposure Reduction Program is needed to address public health impacts of mercury in Delta fish, including activities that reduce actual and potential exposure of and mitigate health impacts to those people and communities most likely to be affected by mercury in Delta caught fish, such as subsistence fishers and their families. The Exposure Reduction Program must include elements directed toward:

- i. Developing and implementing community-driven activities to reduce mercury exposure;
- ii. Raising awareness of fish contamination issues among people and communities most likely affected by mercury in Delta-caught fish such as subsistence fishers and their families;
- iii. Integrating community-based organizations that serve Delta fish consumers, Delta fish consumers, tribes, and public health agencies in the design and implementation of an exposure reduction program;
- iv. Identifying resources, as needed, for community-based organizations and tribes to participate in the Program;
- v. Utilizing and expanding upon existing programs and materials or activities in place to reduce mercury, and as needed, create new materials or activities; and
- vi. Developing measures for program effectiveness.

This Order requires the Discharger participate in a Mercury Exposure Reduction Program (MERP) in accordance with the Delta Mercury Control Program. The Discharger has elected to provide financial support in the collective MERP with other Delta dischargers, rather than be individually responsible for any MERP activities. The objective of the MERP is to reduce mercury exposure of Delta fish consumers most likely affected by mercury. The work plan shall address the Exposure Reduction Program objective, elements, and the Discharger's coordination with other stakeholders. The Discharger shall continue to participate in the group effort to implement the work plan through 2020 or until they comply with all requirements related to the individual or subarea methylmercury allocation. The Discharger shall notify the Central Valley Water Board if it plans to perform mercury exposure reduction activities individually.

c. **Salinity Evaluation and Minimization Plan.** An Evaluation and Minimization Plan for salinity is required to be maintained in this Order to ensure adequate measures are developed and implemented by the Discharger to reduce the discharge of salinity to the Sacramento River.

Order R5-2010-0114-04 included an annual reporting requirement for a Salinity and Municipal Water Supply Study to evaluate the efficacy of salt minimization plans. The Discharger is a regional facility that covers about 20 individual water purveyors.

Due to the complexity of the analysis, limitations on data quality and availability, and resulting uncertainty regarding the output, and because the water supply salinity does not appreciably vary from year to year, this Order reduces the reporting frequency to once during the permit term, as part of the summary update of the effectiveness of the salinity evaluation plan, due within 180 days prior to the permit expiration date.

4. Construction, Operation, and Maintenance Specifications

- a. **Filtration System Operating Specifications.** Turbidity is included as an operational specification as an indicator of the effectiveness of the filtration system for providing adequate disinfection. The tertiary treatment process is capable of reliably meeting a turbidity limitation of 2 NTU as a daily average. Failure of the treatment system such that virus removal is impaired would normally result in increased particles in the effluent, which result in higher effluent turbidity. Turbidity has a major advantage for monitoring filter performance, allowing immediate detection of filter failure and rapid corrective action. The operational specification requires that turbidity prior to disinfection shall not exceed 2 NTU as a daily average; 5 NTU, more than 5 percent of the time within a 24-hour period, and an instantaneous maximum of 10 NTU.
- b. **Emergency Storage Basin Operating Requirements.** The operation and maintenance specifications for the emergency storage basins are necessary to protect the beneficial uses of the groundwater. The specifications included in this Order are retained from Order R5-2010-0114-04. In addition, reporting requirements related to use of the emergency storage basins are required to monitor their use and the potential impact on groundwater.

5. Special Provisions for Municipal Facilities (POTW's Only)

- a. **Pretreatment Requirements**
 - i. The federal CWA section 307(b), and federal regulations, 40 C.F.R. part 403, require publicly owned treatment works to develop an acceptable industrial pretreatment program. A pretreatment program is required to prevent the introduction of pollutants, which will interfere with treatment plant operations or sludge disposal, and prevent pass through of pollutants that exceed water quality objectives, standards or permit limitations. Pretreatment requirements are imposed pursuant to 40 C.F.R. part 403.
 - ii. The Discharger has an approved EPA pretreatment program that includes one non-categorical significant industrial user and 25 categorical significant industrial users.
 - iii. The Discharger shall implement and enforce its approved pretreatment program and is an enforceable condition of this Order. If the Discharger fails to perform the pretreatment functions, the Central Valley Water Board, the State Water Board or U.S. EPA may take enforcement actions against the Discharger as authorized by the CWA.
- b. **Collection System.** The State Water Board issued General Waste Discharge Requirements for Sanitary Sewer Systems, Water Quality Order 2006-0003-DWQ (General Order) on 2 May 2006. The Monitoring and Reporting Requirements for the General Order were amended by Water Quality Order WQ 2008-0002-EXEC on 20 February, 2008. The General Order requires public agencies that own or operate sanitary sewer systems with greater than one mile of pipes or sewer lines to

enroll for coverage under the General Order. The General Order requires agencies to develop sanitary sewer management plans (SSMPs) and report all sanitary sewer overflows (SSO's), among other requirements and prohibitions.

Furthermore, the General Order contains requirements for operation and maintenance of collection systems and for reporting and mitigating sanitary sewer overflows. Inasmuch that the Discharger's collection system is part of the system that is subject to this Order, certain standard provisions are applicable as specified in Provisions, section VI.C.5. For instance, the 24-hour reporting requirements in this Order are not included in the General Order. The Discharger must comply with both the General Order and this Order. The Discharger and public agencies that are discharging wastewater into the facility were required to obtain enrollment for regulation under the General Order by 1 December 2006.

- c. **Anaerobically Digestible Material.** Managers of POTW's increasingly are considering the addition of organic material such as food waste, fats, oils and grease into their anaerobic digesters for co-digestion. Benefits of accepting these materials include increasing the volume of methane and other biogases available for energy production and ensuring such materials are disposed of at the POTW instead of discharged into the collection system potentially causing sanitary sewer overflows. The State Water Board has been working with the California Department of Resources Recycling and Recovery (CalRecycle), the California Department of Food and Agriculture (CDFA), and the California Association of Sanitation Agencies (CASA) to delineate jurisdictional authority for the receipt of hauled-in anaerobically digestible material (ADM¹) at POTW's for co-digestion.

CalRecycle is proposing an exclusion from Process Facility/Transfer Station permits for direct injection of ADM to POTW anaerobic digesters for co-digestion that are regulated under waste discharge requirements or NPDES permits. The proposed CalRecycle exclusion is restricted to ADM that has been prescreened, slurried, and processed/conveyed in a closed system to be co-digested with regular POTW sludge. The CalRecycle exclusion assumes that a POTW has developed Standard Operating Procedures (SOP's) for the proper handling, processing, tracking, and management of the ADM received.

The Discharger currently accepts hauled-in ADM for direct injection into its anaerobic digester for co-digestion. This Order requires the Discharger to develop and implement standard operating procedures. The requirements of the SOP's are discussed in Section VI.C.5.c.

6. Other Special Provisions

- a. **Seasonal Title 22, or Equivalent, Disinfection Requirements.** Consistent with Order R5-2010-0114-04, from May to October wastewater shall be oxidized, coagulated, filtered, and adequately disinfected pursuant to the State Water Board, Division of Drinking Water (DDW) reclamation criteria, CCR, title 22, division 4, chapter 3, (Title 22), or equivalent, in accordance with the compliance schedule in Section VI.C.7.a.

¹ CalRecycle has proposed to define "anaerobically digestible material" to include inedible kitchen grease as defined in Food and Agricultural Code section 19216, food material as defined in California Code of Regulations, title 14, section 17852 and vegetative food material.

7. Compliance Schedules

In general, an NPDES permit must include final effluent limitations that are consistent with CWA section 301 and with 40 C.F.R. section 122.44(d). There are exceptions to this general rule. The State Water Board's Resolution 2008-0025 "*Policy for Compliance Schedules in National Pollutant Discharge Elimination System Permits*" (Compliance Schedule Policy) allows compliance schedules for new, revised, or newly interpreted water quality objectives or criteria, or in accordance with a TMDL. All compliance schedules must be as short as possible, and may not exceed 10 years from the effective date of the adoption, revision, or new interpretation of the applicable water quality objective or criterion, unless a TMDL allows a longer schedule. Where a compliance schedule for a final effluent limitation exceeds one year, the Order must include interim numeric effluent limitations for that constituent or parameter, interim requirements and dates toward achieving compliance, and compliance reporting within 14 days after each interim date. The Order may also include interim requirements to control the pollutant, such as pollutant minimization and source control measures.

In accordance with the Compliance Schedule Policy and 40 C.F.R. section 122.47, a discharger who seeks a compliance schedule must demonstrate additional time is necessary to implement actions to comply with a more stringent permit limitation. The discharger must provide the following documentation as part of the application requirements:

- Diligent efforts have been made to quantify pollutant levels in the discharge and the sources of the pollutant in the waste stream, and the results of those efforts;
- Source control efforts are currently underway or completed, including compliance with any pollution prevention programs that have established;
- A proposed schedule for additional source control measures or waste treatment;
- Data demonstrating current treatment facility performance to compare against existing permit effluent limits, as necessary to determine which is the more stringent interim, permit effluent limit to apply if a schedule of compliance is granted;
- The highest discharge quality that can reasonably be achieved until final compliance is attained;
- The proposed compliance schedule is as short as possible, given the type of facilities being constructed or programs being implemented, and industry experience with the time typically required to construct similar facilities or implement similar programs; and
- Additional information and analyses to be determined by the Regional Water Board on a case-by-case basis.

Based on information submitted with the ROWD, SMR's, and other miscellaneous submittals, it has been demonstrated to the satisfaction of the Central Valley Water Board that the Discharger needs time to implement actions to comply with the new effluent limitations for ammonia, seasonal Title 22 requirements, and methylmercury.

a. **Ammonia and Seasonal Title 22 (or Equivalent) Disinfection Requirements.**

The Discharger submitted a request, and justification (dated 20 August 2010), for a compliance schedule for BOD₅, TSS, ammonia, and total coliform organisms. This Order retains compliance schedules from Order R5-2010-0114-04 for the final WQBEL's for BOD₅, TSS, and total coliform organisms with compliance required by 9 May 2023, and ammonia with full compliance by 11 May 2021. These final

compliance dates were originally 1 December 2020, but have been stayed by certain orders issued by the Sacramento County Superior Court, Honorable Michael Kenny. The stays resulted in change, or shift by a period of time, in the compliance deadlines as well as in the schedule for certain steps toward compliance. The operative orders were issued by the Superior Court on 13 July 2012 and 6 May 2013.

- b. **Methylmercury.** The Delta Mercury Control Program is composed of two phases. Phase 1 spans from 20 October 2011 through the Phase I Delta Mercury Control Program Review, expected to conclude by October 2020. Phase 1 emphasizes studies and pilot projects to develop and evaluate management practices to control methylmercury. Phase 1 includes provisions for: implementing pollution minimization programs and interim mass limits for inorganic (total) mercury point sources in the Delta and Yolo Bypass; controlling sediment-bound mercury in the Delta and Yolo Bypass that may become methylated in agricultural lands, wetland, and open-water habitats; and reducing total mercury loading to San Francisco Bay, as required by the *Water Quality Control Plan for the San Francisco Bay Basin*.

At the end of Phase 1, the Central Valley Water Board will conduct a Phase 1 Delta Mercury Control Program Review that considers: modification of methylmercury goals, objectives, allocations and/or the Final Compliance Date; implementation of management practices and schedules for methylmercury controls; and adoption of a mercury offset program for dischargers who cannot meet their load and waste load allocations after implementing all reasonable load reduction strategies. The review also will consider other potential public and environmental benefits and negative impacts (e.g., habitat restoration, flood protection, water supply, fish consumption) of attaining the allocations. The fish tissue objectives, the linkage analysis between objectives and sources, and the attainability of the allocations will be re-evaluated based on the findings of Phase 1 control studies and other information. The linkage analysis, fish tissue objectives, allocations, and time schedules shall be adjusted at the end of Phase 1, or subsequent program reviews, if appropriate.

Phase 2 begins after the Phase 1 Delta Mercury Control Program Review or by 20 October 2022, whichever occurs first, and ends in 2030. During Phase 2, dischargers shall implement methylmercury control programs and continue inorganic (total) mercury reduction programs. Compliance monitoring and implementation of upstream control programs also shall occur in Phase 2. Any compliance schedule contained in an NPDES permit must be “... *an enforceable sequence of actions or operations leading to compliance with an effluent limitation...*” per the definition of a compliance schedule in CWA Section 502(17). See also 40 C.F.R. section 122.2 (definition of schedule of compliance). The compliance schedule for methylmercury meets these requirements.

Federal Regulations at 40 C.F.R. section 122.47(a)(1) requires that, “*Any schedules of compliance under this section shall require compliance as soon as possible...*” The Compliance Schedule Policy also requires that compliance schedules are as short as possible and may not exceed 10 years, except when “...*a permit limitation that implements or is consistent with the waste load allocations specified in a TMDL that is established through a Basin Plan amendment, provided that the TMDL implementation plan contains a compliance schedule or implementation schedule.*” As discussed above, the Basin Plan’s Delta Mercury Control Program includes compliance schedule provisions and allows compliance with the waste load allocations for methylmercury by 2030. Until the Phase 1 Control Studies are complete and the Central Valley Water Board conducts the Phase 1 Delta Mercury

Control Program Review, it is not possible to determine the appropriate compliance date for the Discharger that is as soon as possible. Therefore, this Order establishes a compliance schedule for the new, final WQBEL's for methylmercury with full compliance required by 31 December 2030, which is consistent with the Final Compliance Date of the TMDL. At completion of the Phase 1 Delta Mercury Control Program Review, the final compliance date for this compliance schedule will be re-evaluated to ensure compliance is required as soon as possible. Considering the available information, the compliance schedule is as short as possible in accordance with federal regulations and the Compliance Schedule Policy.

VII. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

CWA section 308 and 40 C.F.R. sections 122.41(h), (j)-(l), 122.44(i), and 122.48 require that all NPDES permits specify monitoring and reporting requirements. Water Code sections 13267 and 13383 also authorize the Central Valley Water Board to establish monitoring, inspection, entry, reporting, and recordkeeping requirements. The Monitoring and Reporting Program (MRP), Attachment E of this Order establishes monitoring, reporting, and recordkeeping requirements that implement federal and state requirements. The following provides the rationale for the monitoring and reporting requirements contained in the MRP for this Facility.

A. Influent Monitoring

1. Influent monitoring is required to collect data on the characteristics of the wastewater and to assess compliance with effluent limitations (e.g., BOD₅ and TSS reduction requirements). The monitoring frequencies for flow (continuous), BOD₅ (daily), pH (continuous), TSS (daily), electrical conductivity (weekly), and total dissolved solids (monthly) have been retained from Order R5-2010-0114-04.
2. Influent monitoring is required to collect data on the characteristics of the Groundwater CAP discharge to the Facility. The monitoring frequencies for flow (monthly), priority pollutant metals, electrical conductivity, total dissolved solids, and nitrates (twice per year) have been retained from Order R5-2010-0114-04.

B. Effluent Monitoring

1. Pursuant to the requirements of 40 C.F.R. section 122.44(i)(2) effluent monitoring is required for all constituents with effluent limitations. Effluent monitoring is necessary to assess compliance with effluent limitations, assess the effectiveness of the treatment process, and to assess the impacts of the discharge on the receiving stream and groundwater.
2. This Order requires effluent monitoring for BOD₅, TSS, and total coliform organisms at Monitoring Location EFF-001. Upon upgrades to the emergency storage basins, the Discharger proposes to use the basins for multiple uses, including storage and treatment of non-final wastewater (e.g., untreated or partially-treated wastewater) and final treated wastewater. The proposed multiple use basins have been designed with a double block and bleed system and monitoring system to ensure water does not unintentionally transfer between basins. Furthermore, a high pressure cleaning system will be used after the basins store non-final wastewater. This Order requires the Discharger to conduct a study and/or monitoring to demonstrate the emergency storage basin cleaning and isolation systems will not allow for wastewater pathogens to be reintroduced to the final effluent following the prior use of the emergency storage basins for non-final (e.g., untreated or partially-treated wastewater). This Order also requires the Discharger to develop Emergency Storage Basin Cleaning and Isolation System Study and Standard Operating Procedures in Special Provisions VI.C.2.d. Upon Executive Officer approval of the final study results and standard operating procedures, compliance with final effluent

limitations for BOD5 and TSS shall be measured at Monitoring Location TER-001. Otherwise, compliance shall be measured at Monitoring Location EFF-001.

3. Effluent monitoring frequencies and sample types for flow (continuous), BOD₅ (daily), pH (continuous), TSS (daily), bis (2-ethylhexyl) phthalate (monthly), carbon tetrachloride (monthly), chlorodibromomethane (monthly), total and dissolved copper (monthly), methylene chloride (monthly), cyanide (monthly), mercury (monthly), alkalinity (monthly), ammonia (monthly), chlorine residual (continuous), *Cryptosporidium* (monthly), dissolved oxygen (continuous), electrical conductivity (weekly), *Giardia* (monthly), hardness (monthly), methylmercury (monthly), nitrate plus nitrite (weekly), oil and grease (monthly), settleable solids (daily), sulphur dioxide or sodium bisulfite (continuous), temperature (continuous), total coliform organisms (daily), total dissolved solids (weekly), total Kjeldahl nitrogen (weekly), and total organic carbon (monthly) have been retained from Order R5-2010-0114-04 to determine compliance with effluent limitations, where applicable, and characterize the effluent for these parameters.
4. Monitoring data collected over the term of Order R5-2010-0114-04 for aluminum, manganese, tetrachloroethylene, pentachlorophenol, dibenzo(a,h)anthracene, and methyl tertiary butyl ether did not demonstrate reasonable potential to exceed water quality objectives/criteria. Thus, specific monitoring requirements for these parameters have not been retained from Order R5-2010-0114-04.
5. Timing, duration and purpose of wastewater diversions, effluent or influent, is a measure of proper operation of the wastewater treatment plant and is required to be reported on a monthly basis. In addition, the Discharger shall submit an annual summary of effluent diversions with the annual self-monitoring report.
6. In accordance with Section 1.3 of the SIP, periodic monitoring is required for priority pollutants for which criteria or objectives apply and for which no effluent limitations have been established. This Order requires effluent monitoring for priority pollutants and other constituents of concern monthly every other calendar year. See section IX.B of the Monitoring and Reporting Program (Attachment E) for more detailed requirements related to performing priority pollutant monitoring.
7. Water Code section 13176, subdivision (a), states: *"The analysis of any material required by [Water Code sections 13000-16104] shall be performed by a laboratory that has accreditation or certification pursuant to Article 3 (commencing with Section 100825) of Chapter 4 of Part 1 of Division 101 of the Health and Safety Code."* DDW certifies laboratories through its Environmental Laboratory Accreditation Program (ELAP).

Section 13176 cannot be interpreted in a manner that would violate federal holding time requirements that apply to NPDES permits pursuant to the CWA. (Wat. Code §§ 13370, subd. (c), 13372, 13377.) Section 13176 is inapplicable to NPDES permits to the extent it is inconsistent with CWA requirements. (Wat. Code § 13372, subd. (a).) The holding time requirements are 15 minutes for chlorine residual, dissolved oxygen, and pH, and immediate analysis is required for temperature. (40 C.F.R. § 136.3(e), Table II) The Discharger maintains an ELAP certified laboratory on-site and conducts analysis for chlorine residual, dissolved oxygen, and pH within the required 15 minute hold times.

C. Whole Effluent Toxicity Testing Requirements

1. **Acute Toxicity.** Consistent with Order R5-2010-0114-04, weekly 96-hour bioassay testing is required to demonstrate compliance with the effluent limitation for acute toxicity.

On 29 March 2018, the Discharger submitted a Programmatic Operations Plan for Effluent Valve Replacement Project (EVR Project). The EVR Project will replace existing effluent valves with new or refurbished valves, in a series of short term disruptions to main plant operations. During each project the Facility will be shut down for up to 48 hours to replace the valves. After the shutdown, the activated sludge system will be stressed for a further 12 days while stored primary effluent or primary influent is returned and the Facility processes are stabilized. During months when the Discharger is implementing the EVR Project, it is infeasible for the Discharger to perform weekly flow-through acute toxicity test. The test requires 2 to 3 days of preparation and at least 4 days of continuous discharge flow to perform the 96-hour flow through acute bioassay. Furthermore, there is uncertainty regarding the EVR Project schedule. After replacing valves for one project shutdown the next shutdown begins as soon as the biological treatment system recovers from the previous shutdown. This period of the shutdown and treatment system recovery is variable and difficult to predict due to the length of the shutdown needed to replace the valve.

2. **Chronic Toxicity.** Consistent with Order R5-2010-0114-04, monthly chronic whole effluent toxicity testing is required in order to demonstrate compliance with the Basin Plan's narrative toxicity objective.

Order R5-2010-0114-04 required the Discharger to conduct a study to determine the feasibility of existing laboratory procedures for *Hyalella azteca* to evaluate both acute and chronic toxicity of the discharge. The Discharger submitted the *Hyalella azteca* Water-only Whole Effluent Toxicity Testing Feasibility Study Report on 20 June 2014. Based on the study, the Discharger concluded that multiple methods have been used by various commercial laboratories and research institutions, but there is no U.S. EPA-promulgated water-only method. Additionally, wide variability exists in test conditions among the currently used water-only methods. A water-only *H. azteca* method would need to be approved by EPA through the Alternative Test Procedure (ATP) process before it could be used for compliance purposes. Therefore, this Order continues to require WET testing using *Ceriodaphnia dubia*, *Pimephales promelas*, and *Selenastrum capricornutum*.

D. Receiving Water Monitoring

1. Surface Water

- a. **Delta Regional Monitoring Program.** The Central Valley Water Board requires individual dischargers and discharger groups to conduct monitoring of Delta waters and Delta tributary waters in the vicinity of their discharge, known as ambient (or receiving) water quality monitoring. This monitoring provides information on the impacts of waste discharges on Delta waters, and on the extant condition of the Delta waters. However, the equivalent funds spent on current monitoring efforts could be used more efficiently and productively, and provide a better understanding of geographic and temporal distributions of contaminants and physical conditions in the Delta, and of other Delta water quality issues, if those funds were used for a coordinated ambient monitoring effort, rather than continue to be used in individual, uncoordinated ambient water quality monitoring programs. The Delta Regional Monitoring Program will provide data to better inform management and policy decisions regarding the Delta.

The Discharger has elected to participate in the Delta Regional Monitoring Program. The Discharger submitted a letter dated 2 December 2014 expressing interest in participating in the Delta Regional Monitoring Program. The Discharger's request to reduce receiving water monitoring and participate in the Delta Regional Monitoring

Program was approved in a letter signed by the Executive Officer dated 24 December 2014.

Delta Regional Monitoring Program data is not intended to be used directly to represent either upstream or downstream water quality for purposes of determining compliance with this Permit. Delta Regional Monitoring Program monitoring stations are established generally as "integrator sites" to evaluate the combined impacts on water quality of multiple discharges into the Delta; Delta Regional Monitoring Program monitoring stations would not normally be able to identify the source of any specific constituent, but would be used to identify water quality issues needing further evaluation. Delta Regional Monitoring Program monitoring data may be used to help establish background receiving water quality for an RPA in an NPDES permit after evaluation of the applicability of the data for that purpose. In general, monitoring data from samples collected in the immediate vicinity of the discharge will be given greater weight in permitting decisions than receiving water monitoring data collected at greater distances from the discharge point. Delta Regional Monitoring Program data, as with all environmental monitoring data, can provide an assessment of water quality at a specific place and time that can be used in conjunction with other information, such as other receiving water monitoring data, spatial and temporal distribution and trends of receiving water data, effluent data from the Discharger's discharge and other point and non-point source discharges, receiving water flow volume, speed and direction, and other information to determine the likely source or sources of a constituent that resulted in exceedance of a receiving water quality objective.

The Discharger shall continue to participate in the Delta Regional Monitoring Program until such time as the Discharger informs the Board that participation in the Delta Regional Monitoring Program will cease. Participation in the Delta Regional Monitoring Program by a Discharger shall consist of providing funds and/or in-kind services to the Delta Regional Monitoring Program at least equivalent to discontinued individual monitoring and study efforts. If a discharger or discharger group fails to maintain adequate participation in the Delta Regional Monitoring Program, as determined through criteria to be developed by the Delta Regional Monitoring Program Steering Committee, the Steering Committee will recommend to the Central Valley Water Board that an individual monitoring program be reinstated for that discharger or discharger group.

Since the Discharger is participating in the Delta Regional Monitoring Program this Order does not require receiving water characterization monitoring for purposes of conducting the RPA. However, the Report of Waste Discharge for the next permit renewal shall include, at minimum, one representative ambient background characterization monitoring event for priority pollutant constituents² during the term of the permit. Data from the Delta Regional Monitoring Program may be utilized to characterize the receiving water in the permit renewal. Alternatively, the Discharger may conduct any site-specific receiving water monitoring deemed appropriate by the Discharger and submit that monitoring data with the Report of Waste Discharge. In general, monitoring data from samples collected in the immediate vicinity of the discharge will be given greater weight in permitting decisions than receiving water monitoring data collected at greater distances from the discharge point. Historic receiving water monitoring data taken by the Discharger and from other sources may also be evaluated to determine whether or not that data is representative of

² Appendix A to 40 C.F.R. part 423.

current receiving water conditions. If found to be representative of current conditions, then that historic data may be used in characterizing receiving water quality for the purposes of the RPA.

- b. Upstream and downstream receiving water monitoring requirements at Monitoring Locations RSWU-001, and RSWD-003 is included for flow (continuous), fecal coliform organisms (quarterly), pH (monthly), ammonia (monthly), dissolved oxygen (monthly), electrical conductivity (monthly), hardness (monthly), temperature (monthly), total nitrogen (monthly), and turbidity (monthly).
- c. In accordance with Section 1.3 of the SIP, periodic monitoring is required for priority pollutants for which criteria or objectives apply and for which no effluent limitations have been established. This Order requires the Report of Waste Discharge for the next permit renewal shall include, at minimum, one representative ambient background characterization monitoring event for priority pollutant constituents³ during the term of the permit, in order to collect data to conduct an RPA for the next permit renewal.

2. Groundwater – Not Applicable

E. Other Monitoring Requirements

1. **Filtration System Monitoring.** Effluent monitoring requirements for turbidity at Monitoring Location FIL-001 are retained from Order R5-2010-0114-04 to determine compliance with the operational specifications for turbidity in Special Provision VI.C.4.a of this Order.
2. **Discharge Monitoring Report-Quality Assurance (DMR-QA) Study Program.** Under the authority of section 308 of the CWA (33 U.S.C. § 1318), U.S. EPA requires major permittees under the NPDES Program to participate in the annual DMR-QA Study Program. The DMR-QA Study evaluates the analytical ability of laboratories that routinely perform or support self-monitoring analyses required by NPDES permits. There are two options to satisfy the requirements of the DMR-QA Study Program: (1) The Discharger can obtain and analyze a DMR-QA sample as part of the DMR-QA Study; or (2) Per the waiver issued by U.S.EPA to the State Water Board, the Discharger can submit the results of the most recent Water Pollution Performance Evaluation Study from their own laboratories or their contract laboratories. A Water Pollution Performance Evaluation Study is similar to the DMR-QA Study. Thus, it also evaluates a laboratory's ability to analyze wastewater samples to produce quality data that ensure the integrity of the NPDES Program. The Discharger shall submit annually the results of the DMR-QA Study or the results of the most recent Water Pollution Performance Evaluation Study to the State Water Board. The State Water Board's Quality Assurance Program Officer will send the DMR-QA Study results or the results of the most recent Water Pollution Performance Evaluation Study to U.S. EPA's DMR-QA Coordinator and Quality Assurance Manager.

VIII. PUBLIC PARTICIPATION

The Central Valley Water Board has considered the issuance of WDR's that will serve as an NPDES permit for the Facility. As a step in the WDR adoption process, the Central Valley Water Board staff has developed tentative WDR's and has encouraged public participation in the WDR adoption process.

A. Notification of Interested Parties

³ Appendix A to 40 C.F.R. part 423.

The Central Valley Water Board notified the Discharger and interested agencies and persons of its intent to prescribe WDR's for the discharge and provided an opportunity to submit written comments and recommendations. Notification was provided through the following: publication of a notice of public hearing (Notice) in the Sacramento Bee on 10 February 2016, posting of the Notice at the Facility, Citrus Highs City Hall, Elk Grove City Hall, Folsom City Hall, Rancho Cordova City Hall, Sacramento City Hall, West Sacramento City Hall, and US Post Office, and posting of the Notice on the Central Valley Water Board's website.

The public had access to the agenda and any changes in dates and locations through the Central Valley Water Board's website at:
http://www.waterboards.ca.gov/centralvalley/board_info/meetings/

B. Written Comments

Interested persons were invited to submit written comments concerning tentative WDR's as provided through the notification process. Comments were due either in person or by mail to the Executive Office at the Central Valley Water Board at the address on the cover page of this Order.

To be fully responded to by staff and considered by the Central Valley Water Board, the written comments were due at the Central Valley Water Board office by 5:00 p.m. on 7 March 2016.

C. Public Hearing

The Central Valley Water Board held a public hearing on the tentative WDR's during its regular Board meeting on the following date and time and at the following location:

Date: 21/22 April 2016
Time: 8:30 a.m.
Location: Regional Water Quality Control Board, Central Valley Region
1685 "E" Street
Fresno, CA 93706

Interested persons were invited to attend. At the public hearing, the Central Valley Water Board heard testimony pertinent to the discharge, WDR's, and permit. For accuracy of the record, important testimony was requested in writing.

D. Reconsideration of Waste Discharge Requirements

Any aggrieved person may petition the State Water Board to review the decision of the Central Valley Water Board regarding the final WDR's. The petition must be received by the State Water Board at the following address within 30 calendar days of the Central Valley Water Board's action:

State Water Resources Control Board
Office of Chief Counsel
P.O. Box 100, 1001 I Street
Sacramento, CA 95812-0100

For instructions on how to file a petition for review, see
http://www.waterboards.ca.gov/public_notices/petitions/water_quality/wqpetition_instr.shtml

E. Information and Copying

The Report of Waste Discharge, other supporting documents, and comments received are on file and may be inspected at the address above at any time between 8:30 a.m. and 4:45 p.m., Monday through Friday. Copying of documents may be arranged through the Central Valley Water Board by calling (916) 464-3291.

F. Register of Interested Persons

Any person interested in being placed on the mailing list for information regarding the WDR's and NPDES permit should contact the Central Valley Water Board, reference this facility, and provide a name, address, and phone number.

G. Additional Information

Requests for additional information or questions regarding this order should be directed to Xuan Luo at (916)464-4606.

ATTACHMENT G – SUMMARY OF REASONABLE POTENTIAL ANALYSIS

Constituent	Units	MEC	B	C	CMC	CCC	Water & Org	Org. Only	Basin Plan	MCL	Reasonable Potential
Aluminum, Total Recoverable	µg/L	17 ¹	248 ¹	200	750 ²	--	--	--	--	200	No
Ammonia Nitrogen, Total (as N)	mg/L	43	0.26	2.45	5.62 ²	2.45 ³	--	--	--	--	Yes
Benzo(a)anthracene	µg/L	0.0067	0.0023	0.0044	--	--	0.0044	0.049	--	--	No ⁴
Benzo(b)fluoranthene	µg/L	0.0057	0.0054	0.0044	--	--	0.0044	0.049	--	--	No ⁴
Benzo(k)fluoranthene	µg/L	0.0033	0.005	0.0044	--	--	0.0044	0.049	--	--	No ⁴
Bis (2-ethylhexyl) Phthalate	µg/L	8.1	1.93	1.8	--	--	1.8	5.9	--	4	Yes
Carbon Tetrachloride	µg/L	2.9	<0.16	0.25	--	--	0.25	4.4	--	0.5	Yes
Chloride	mg/L	110	11	230	860 ²	230 ⁵	--	--	--	250	No
Chlorodibromomethane	µg/L	0.33	<0.17	0.41	--	--	0.41	34	--	80 ⁶	Yes ⁴
Chlorpyrifos	µg/L	<0.003	0.004	0.015	--	--	--	--	0.015	--	No
Chrysene	µg/L	0.0129	0.0114	0.0044	--	--	0.0044	0.049	--	--	No ⁴
Copper, Total Recoverable	µg/L	10	5.8	8.0	12	8.0	1,300	--	10	1,000	Yes
Cyanide, Total (as CN)	µg/L	8.6	0.77	5.2	22	5.2	700	220,000	10	150	Yes
Diazinon	µg/L	<0.004	0.0004	0.10	--	--	--	--	0.10	--	No
Dibenzo(a,h)anthracene	µg/L	<0.001	<0.001	0.0044	--	--	0.0044	0.049	--	--	No
Dichlorobromomethane	µg/L	2.3	<0.16	0.56	--	--	0.56	46	--	80 ⁶	Yes
1,2-Diphenylhydrazine	µg/L	<0.01184	<0.05	0.040	--	--	0.040	0.54	--	--	No
Electrical Conductivity @ 20°C	µmhos/cm	907 ¹	176 ¹	450	--	--	--	--	450	900	No ⁴
Iron, Total Recoverable	µg/L	235 ¹	704 ¹	300	--	--	--	--	300	300	No
Manganese, Total Recoverable	µg/L	73 ¹	20 ¹	50	--	--	--	--	50	50	No ⁴
Mercury, Total Recoverable	ng/L	8.2	5.9	50	--	--	50	51	--	2,000	Yes ⁴
Methylene Chloride	µg/L	5	<0.2	4.7	--	--	4.7	1,500	--	5	Yes
Methylmercury	ng/L	0.65	0.17	--	--	--	--	--	--	--	Yes ⁴
Methyl Tertiary Butyl Ether	µg/L	<0.059	0.3	5	--	--	--	--	--	5	No
Nitrate Nitrogen, Total (as N)	mg/L	0.52	0.34	10	--	--	--	--	--	10	Yes ⁴

Constituent	Units	MEC	B	C	CMC	CCC	Water & Org	Org. Only	Basin Plan	MCL	Reasonable Potential
Nitrite Nitrogen, Total (as N)	mg/L	0.084	0.0054	1.0	--	--	--	--	--	1.0	Yes ⁴
N-nitrosodimethylamine	µg/L	0.035	<0.05	0.00069	--	--	0.00069	8.1	--	--	No ⁴
Pentachlorophenol	µg/L	<0.05	<0.05	0.28	5.3	4.1	0.28	8.2	--	1	No
Sulfate	mg/L	110 ¹	7.5 ¹	250	--	--	--	--	--	250	No
Tetrachloroethylene	µg/L	<0.19	<0.19	0.8	--	--	0.8	8.85	--	5	No
Total Dissolved Solids	mg/L	435 ¹	119 ¹	500	--	--	--	--	--	500	No

General Note: All inorganic concentrations are given as a total recoverable.

MEC = Maximum Effluent Concentration

B = Maximum Receiving Water Concentration or lowest detection level, if non-detect

C = Criterion used for Reasonable Potential Analysis

CMC = Criterion Maximum Concentration (CTR or NTR)

CCC = Criterion Continuous Concentration (CTR or NTR)

Water & Org = Human Health Criterion for Consumption of Water & Organisms (CTR or NTR)

Org. Only = Human Health Criterion for Consumption of Organisms Only (CTR or NTR)

Basin Plan = Numeric Site-specific Basin Plan Water Quality Objective

MCL = Drinking Water Standards Maximum Contaminant Level

NA = Not Available

ND = Non-detect

Footnotes:

- (1) Represents the maximum observed annual average concentration for comparison with the MCL.
- (2) U.S. EPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 1-hour average.
- (3) U.S. EPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 30-day average.
- (4) See section IV.C.3 of the Fact Sheet for a discussion of the RPA results.
- (5) U.S. EPA National Recommended Ambient Water Quality Criteria, Freshwater Aquatic Life Protection, 4-day average.
- (6) Represents the Primary MCL for total trihalomethanes, which includes bromoform, chlorodibromomethane, chloroform, and dichlorobromomethane.

ATTACHMENT H – CALCULATION OF WQBEL'S

Human Health WQBEL's Calculations									
Parameter	Units	Criteria	Mean Background Concentration	Dilution Factor	MDEL/AMEL Multiplier	AMEL Multiplier	AMEL	MDEL	AWEL
Bis (2-ethylhexyl) phthalate	µg/L	1.8	0.32	55	2.2	1.7	8.9 ¹	20 ²	--
Carbon Tetrachloride	µg/L	0.25	0.16	55	2.0	1.6	2.9 ¹	5.3 ²	--
Methylene Chloride	µg/L	4.7	--	--			4.7	11	--
Chlorodibromomethane	µg/L	0.41	0.17	55	2.0	1.6	14	27	--
Dichlorobromomethane	µg/L	0.56	0.16	55	1.6	1.3	23	36	--
Nitrate Plus Nitrite	mg/L	10	0.34 ³	0	3.0	2.6	10	--	22

¹ AMEL calculated using the performance-based MDEL and the AMEL/MDEL multiplier.

² Reflects the performance-based MDEL.

³ Maximum background concentration.

Aquatic Life QBEL's Calculations															
Parameter	Units	Criteria		Dilution Factors		Aquatic Life Calculations							Final Effluent Limitations		
		CMC	CCC	CMC	CCC	ECA Multiplier ^{acute}	LTA ^{acute}	ECA Multiplier ^{chronic}	LTA ^{chronic}	AMEL Multiplier ⁹⁵	AWEL Multiplier	MDEL Multiplier ⁹⁹	AMEL ¹	AWEL ²	MDEL ³
Ammonia Nitrogen, Total (as N) (1 April – 31 October)	mg/L	5.62 ⁴	1.45 ⁴	0	0	0.78	4.4	0.96	1.39	1.03	1.25	--	1.5 ⁵	1.7	--
Ammonia Nitrogen, Total (as N) (1 November – 31 March)	mg/L	5.62 ⁴	2.43 ⁴	0	0	0.72	4.1	0.94	2.29	1.04	1.33	--	2.4 ⁵	3.0	--
Copper, Total Recoverable ¹⁰	µg/L	12 ⁸	8.0 ⁸	0	2.45 ¹¹	0.61	7.2	0.77	10.4	1.20	--	1.65	8.6	--	12
Cyanide, Total (as CN) ⁹	µg/L	22	5.2	0	⁶	0.42	9.2	⁷	17.3 ⁷	1.38	--	2.38	13	--	22

¹ Average Monthly Effluent Limitations are calculated according to Section 1.4 of the SIP using a 95th percentile occurrence probability.

² Average Weekly Effluent Limitations are calculated according to Section 1.4 of the SIP using a 98th percentile occurrence probability.

³ Maximum Daily Effluent Limitations are calculated according to Section 1.4 of the SIP using a 99th percentile occurrence probability.

⁴ Reflects the criteria from Order R5-2010-0114-04.

⁵ Reflects the AMEL from Order R5-2010-0114-04.

⁶ Variable, based on dynamic modeling results.

⁷ LTA^{chronic} based on dynamic modeling results for a 60 foot chronic aquatic life mixing zone.

⁸ CTR criteria calculated based on an actual measured ambient hardness of 84 mg/L (as CaCO₃), see Attachment F Section IV.C.2.e for details.

⁹ Effluent limitations for cyanide calculated using a dynamic model per Section 1.4.C of the SIP.

¹⁰ Effluent limitations for copper calculated using a steady-state model per Section 1.4. B of the SIP.

¹¹ Based on 95th percentile dilution factor estimated at edge of 60 foot chronic aquatic life mixing zone.

ATTACHMENT I – THERMAL PLAN EXCEPTIONS

I. Introduction

The Sacramento Regional County Sanitation District (Discharger) has requested exceptions to temperature objectives contained in the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Water and Enclosed Bays and Estuaries of California (Thermal Plan) for the Sacramento Regional Wastewater Treatment Plant (SRWTP) discharge to the Sacramento River within the Sacramento-San Joaquin Delta (Delta). The Thermal Plan allows regional boards to provide exceptions in accordance with Clean Water Act (CWA) section 316(a) and federal regulations. The exceptions shown in Table I-1, below, have been allowed in this Order in accordance with 40 C.F.R. Section 125.73(a), which provides that, *“Thermal discharge effluent limitations or standards established in permits may be less stringent than those required by applicable standards and limitations if the discharger demonstrates to the satisfaction of the director that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. This demonstration must show that the alternative effluent limitation desired by the discharger, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made.”* To meet the Thermal Plan objectives without exceptions, the Discharger would need to construct chillers with an estimated construction cost of \$638 million and annual operating costs of \$22 million.¹

Table I-1. Thermal Plan Exceptions

Thermal Plan Requirements (CWA Section 5.A.(1)a-c)	NPDES Permit Requirements
5.A.(1)a The maximum effluent temperature shall not exceed the natural receiving water temperature by more than 20°F	Exception from 1 October through 30 April The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than: <ul style="list-style-type: none"> • 25°F from 1 October through 30 April; or • 20°F from 1 May through 30 September
5.A.(1)b Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.	Exception when the natural receiving water temperature is less than 65° F <ul style="list-style-type: none"> • <u>If the natural receiving water temperature is less than 65° F:</u> The discharge shall not create a zone, defined by water temperature of more than 2° F above the natural receiving water temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution. • <u>If the natural receiving water temperature is 65° F or greater:</u> The discharge shall not create a zone, defined by water temperature of more than 1° F above the natural receiving water temperature, which exceeds 25 percent of the cross sectional area of the River at any point

¹ Memorandum submitted by the Discharger on 11 December 2015, “Project Cost and Schedule for Compliance with Thermal Plan without Seasonal Exception”.

Thermal Plan Requirements (CWA Section 5.A.(1)a-c)	NPDES Permit Requirements
	outside the zone of initial dilution.
5.A.(1)c No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.	No Exception

Consideration of Thermal Plan Exceptions

Based on all evidence in the record the Central Valley Water Board finds that the Discharger has adequately demonstrated through comprehensive thermal effect studies that the effluent and receiving water limitations based on the Thermal Plan are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. The Board also finds that the alternative limitations, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the Sacramento River and Delta. The findings and conclusions relating to Code of Federal Regulations, title 40, section 125.73(a) are based on studies that analyzed the entire thermal effect of the discharge. Following is a summary of the evidence supporting the findings.

- **Continued exceptions would allow minor and transient exceedance of Thermal Plan objectives within a small zone.**

Exceptions would primarily be needed during three months of the year when river temperatures are below 65°F. This is the time of year when river flows are highest and ambient temperatures are low.

The thermal plume quickly assimilates in the receiving water so the thermal impacts are limited to the near-field plume that under worst-case flow conditions is contained in the vicinity of the diffuser. Due to requirements in this Order¹ the worst-case flow conditions occur infrequently and for only a matter of minutes at a time. It is only within a portion of the plume near the bottom of the channel where the temperature differential required under Thermal Plan Objective 5.A. (1)a (i.e., 20°F temperature differential) is not always met. Even there, the 20°F differential is always met beyond about 10-20 feet downstream of the diffuser under typical flow conditions (i.e., 46:1) and beyond about 35-70 feet downstream of the diffuser during worst case flow conditions (i.e., 14:1). See Figures I-3a and I-3b, below for graphics depicting the thermal plume.

Under fully mixed conditions (far-field conditions) Sacramento River temperatures would not change measurably with or without the exceptions. In other words, in the far-field (within 3 miles from discharge point where the discharge is completely mixed) thermal impacts would be virtually the same if the Discharger were to upgrade to fully meet the Thermal Plan objectives, versus continuing to operate under the limited exceptions.

¹ The worst-case flow condition is a 14:1 flow ratio (river: effluent). This Order contains Discharge Prohibition III.F that prohibits the discharge when the flow ratio is less than 14:1. The Discharger diverts effluent flow to emergency storage basins until the flow in the river increases.

- **There are no demonstrable negative impacts to any aquatic organisms when considering population level or local level impacts**

The thermal exposures in the near-field plume area and far-field downstream areas do not exceed lethal or sub-lethal effect thresholds for aquatic life. Studies have shown that fishes do not hold within the plume area for sufficient periods of time to experience thermal induced toxicity and similarly, floating organisms are exposed to elevated temperatures for only short periods. Depending on the river velocities, the thermal exposures range from approximately 3 to 33 minutes until reaching downstream river temperatures within 1-2°F of background temperatures.

- **There are sufficient zones of passage and no impairment of fish migration.**

The thermal plume of the discharge will not result in blockage or significant delay of upstream migration of adult fishes or downstream migration of larval and juvenile fishes.

The Sacramento River at the point of discharge is 600 feet wide. Under all near-field conditions modeled, a zone of passage approximately 75-100 feet wide occurs along the west bank and 175-200 feet wide occurs along the east bank.

The warmest part of the thermal plume is located close to the bottom of the river where few fish are exposed and exposure time ranges from seconds to minutes.

- **The thermal plume does not increase predation.**

Based on the findings of the temperature studies, large numbers of predatory fishes are not holding at the diffuser site due to elevated water temperatures.

Predatory fishes were not holding in the warmer water plume near the diffuser, where they could prey upon Endangered Species Act (ESA)-listed fishes as they migrate past the diffuser.

- **No demonstrable negative impacts to aquatic organisms when considering cumulative effects**

The scientific studies to determine whether there are any negative impacts to aquatic life, impairment of fish migration, or increased predation were done in consideration of existing conditions along the river (above and below the discharge). Therefore, any other existing stressors that could combine cumulatively to negatively affect the aquatic community have also been considered. There are no demonstrable negative impacts to aquatic organisms when considering cumulative effects of conditions above and below the discharge.

- **Compliance with the Thermal Plan objectives would substantially increase the carbon footprint of the Facility for no demonstrable water quality improvement.**

SRWTP currently has an electrical power draw of approximately 12 megawatts (MW). To comply with the Thermal Plan objectives, it is estimated that an additional 70 MW would be needed at full load. This nearly 6 fold increase in power consumption would substantially increase SRWTP's greenhouse gas production and raise energy costs without demonstrable water quality improvements. The increased energy consumption is equivalent to the power needs of approximately 100,000 people.

- **State and federal fishery agencies provided technical assistance**

The United States Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the California Department of Fish and Wildlife (CDFW) (collectively, fishery agencies) participated during development of the 2013 Temperature study. In addition, USFWS participated in the development of the 2015 Delta Smelt Addendum.

Concurrence from the fishery agencies is not required for the Central Valley Water Board to grant exceptions to the Thermal Plan, however Central Valley Water Board staff requested technical assistance. The fishery agencies could not provide an official consultation, but have provided technical assistance and direction in the development and review of the temperature studies. Letters have been provided by the state and federal fishery agencies documenting that the studies are complete, the scientific rationale is sound, and that no further studies are currently needed to evaluate the effects of the thermal discharge (See section II. 4. Permitting/Litigation History for details regarding the fishery agencies comments and recommendations).

- **State Water Board concurrence with Thermal Plan exceptions**

The Thermal Plan states that, "Regional Boards may, in accordance with Section 316(a) of the Federal Water Pollution Control Act of 1972, and subsequent federal regulations including 40 CFR 122, grant an exception to Specific Water Quality Objectives in this Plan. Prior to becoming effective, such exceptions and alternative less stringent requirements must receive the concurrence of the State Board." (Thermal Plan, General Water Quality Provisions) To satisfy this requirement, on 14 January 2016, Central Valley Water Board staff provided the rationale and technical justification for allowance of the Thermal Plan exceptions to the State Water Board.¹ State Water Board staff reviewed the information and provided a memorandum on 11 March 2016, stating that, "The information submitted appears adequate to support the need for a Thermal Plan exception for the SRWTP. Therefore, following approval action by the Central Valley Regional Water Quality Control Board (Regional Water Board), State Water Board staff will recommend concurrence by the State Water Board for the Thermal Plan exceptions."²

These findings are based on the results of comprehensive thermal effects studies and a synthesis report submitted by the Discharger. The studies and process of development are further described below.

Thermal Effects Studies

The Discharger has conducted several temperature studies at the request of the Central Valley Water Board and the fishery agencies to assess the thermal impacts of the discharge on aquatic life of the lower Sacramento River, including:

- **2010 study:** Thermal Plan Exception Justification for the Sacramento Regional Wastewater Treatment Plant, prepared by Robertson-Bryan, Inc, July 2010
- **2013 study:** Temperature Study to Assess the Thermal Impacts of the Sacramento Regional Wastewater Treatment Plan Discharge on Aquatic Life of the Lower Sacramento River, prepared by Robertson-Bryan, Inc, March 2013
- **2015 Delta Smelt addendum:** Temperature Study to Assess the Thermal Impacts of the Sacramento Regional Wastewater Treatment Plan Discharge on Aquatic Life of the Lower Sacramento River: Delta Smelt Addendum, prepared by Robertson-Bryan, Inc, March 2015
- **2015 report:** Regional San Temperature Study: Synthesis, Supplemental Analysis and Findings Report, prepared by Robertson-Bryan, Inc, December 2015

¹ Memorandum from Pamela Creedon, Executive Officer, Central Valley Water Board to Tom Howard, Executive Director, State Water Board, 14 January 2016

² Memorandum from Karen Larsen, Deputy Director, State Water Board Division of Water Quality to Pamela Creedon, Executive Officer, Central Valley Water Board, 11 March 2016

The 2013 study considered six questions developed as part of a working group that included Central Valley Water Board staff and fishery agency representatives. The rationale of the working group was that if the answers to all six questions was “no,” then the exceptions, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made. The six questions are summarized below.

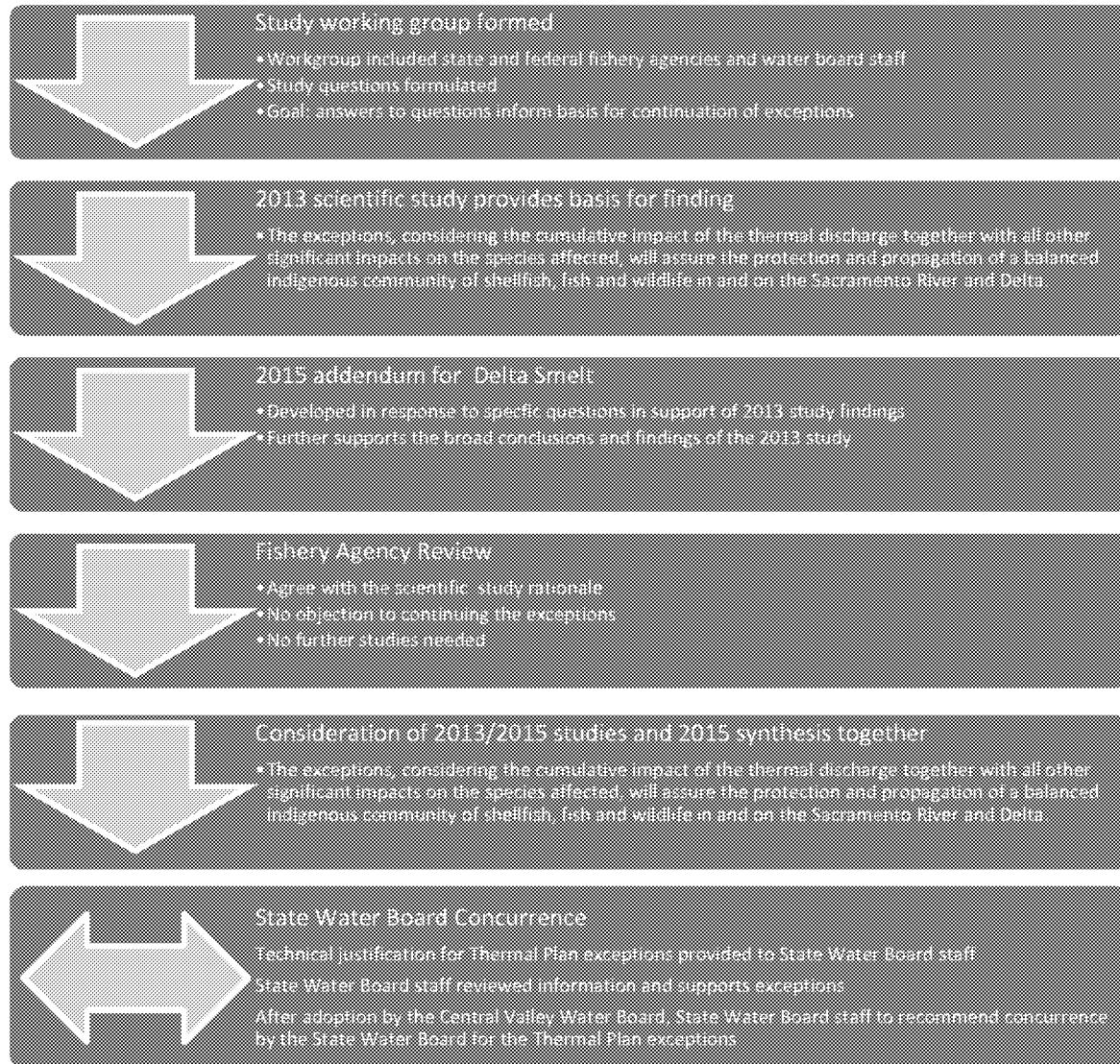
- Question 1. Would special-status fishes migrating past the diffuser, or benthic macroinvertebrates or plankton drifting past the diffuser, experience thermal exposures that would exceed lethal or sub-lethal thresholds?
- Question 2. Does the discharge block or delay migration of fishes?
- Question 3. Are large numbers of predatory fishes holding at the diffuser site due to elevated water temperatures?
- Question 4. Do fishes (migratory or resident) congregate and hold within the plume area for extended periods of time, thereby resulting in sufficient exposure duration to cause acute or chronic toxicity, based on plume water quality?
- Question 5. Are predatory fishes that hold at the diffuser site consuming listed fishes?
- Question 6. Do discharges from the SRWTP increase river temperatures, upon full mixing, by magnitude and duration that would be of concern for aquatic life?

The 2013 study concluded through a number of comprehensive scientific tests that the answer to the above questions was “no.” The tests included fish tagging and tracking, acoustic monitoring, predatory fish sampling and other techniques to assess whether the thermal discharge is causing any impacts to aquatic resources (including cumulative). This conclusion supports continuation of the Thermal Plan exceptions.

Upon reviewing the 2013 study’s conclusions, USFWS requested more information to append the 2013 study regarding a single listed species (Delta Smelt). The Discharger responded to this request with the 2015 Delta Smelt addendum. The 2015 Delta Smelt addendum assessed the potential direct and indirect effects of the thermal discharge on all delta smelt life stages such as adults, larvae, and post-spawn adults, and on delta smelt critical habitat. The study concluded that the discharge “...would not cause lethality to individual delta smelt, result in chronic, adverse sublethal effects, adversely modify delta smelt critical habitat, prevent sustainability or recovery of the delta smelt population, or eliminate access to critical habitat primary constituent elements.” The 2015 Delta Smelt addendum was developed to answer specific questions regarding Delta Smelt. As such, the addendum was never intended to answer all questions relevant to the exceptions, but was intended to supplement the 2013 study findings as requested by USFWS.

The overall approach and logic of these studies is summarized graphically below in Figure I-1 below.

Figure I-1. The Development and Review of Temperature Studies



II. Historical Factual Information

This Order regulates the discharge of secondary treated municipal wastewater and allows an average dry weather discharge flow of 181 million gallons per day (mgd) to the Sacramento River, within the Sacramento-San Joaquin Delta (Delta). SRWTP is a publicly-owned treatment works (POTW) that serves about 1.3 million people in the greater Sacramento area, including the Cities of Folsom, Rancho Cordova, West Sacramento, Sacramento, Elk Grove and Citrus Heights, and urbanized areas of Sacramento County. SRWTP is located in Elk Grove and discharges disinfected secondary treated wastewater to the Sacramento River immediately below the Freeport Bridge. The existing secondary treatment at the facility consists of preliminary screening and grit removal, primary sedimentation, a pure oxygen activated sludge treatment system, and chlorination for disinfection and dechlorination. SRWTP's current permitted discharge is 181 mgd (average dry weather flow) and current flows average 120 mgd. The Discharger is currently upgrading the SRWTP to replace the pure oxygen activated sludge system with a biological nutrient removal activated sludge system in order to meet new effluent limits for ammonia and nitrate by 11 May 2021. In addition, tertiary filtration facilities and chlorine contact chamber will be added to meet new disinfection requirements by 9 May 2023.

SRWTP discharges to the Sacramento River just downstream of the Freeport Bridge via an outfall diffuser. The outfall diffuser is approximately 300 feet long with 74 ports and is placed perpendicular to the river flow. The Sacramento River at point of discharge is 600 feet wide. At times, the river flows in the reverse direction northeast towards the City of Sacramento, due to tidal activity during low river flows. The Discharger diverts its discharge to emergency storage basins whenever these conditions exist. The Discharger has determined in studies that river flows of at least 1,300 cubic feet per second (cfs) and providing a flow ratio of at least 14 to 1 (river:effluent) are required to allow for adequate mixing of the effluent through the outfall diffuser.

1. Thermal Plan

For purposes of the Thermal Plan, the Discharger is considered to be an Existing Discharger of Elevated Temperature Waste. The Thermal Plan in section 5.A. contains the following temperature objectives for surface waters that are applicable to this discharge:

"5. Estuaries

A. Existing discharges

(1) Elevated temperature waste discharges shall comply with the following:

- a. The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.*
- b. Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.*
- c. No discharge shall cause a surface water temperature rise greater than 4°F above the natural temperature of the receiving waters at any time or place.*
- d. Additional limitations shall be imposed when necessary to assure protection of beneficial uses."*

2. Thermal Plan Exceptions

The Thermal Plan allows regional boards to provide exceptions to specific water quality objectives in the Thermal Plan so long as the exceptions comply with CWA section 316(a) and federal regulations. The applicable exception is promulgated in 40 CFR Section 125.73(a),

which provides that, “*Thermal discharge effluent limitations or standards established in permits may be less stringent than those required by applicable standards and limitations if the discharger demonstrates to the satisfaction of the director that such effluent limitations are more stringent than necessary to assure the protection and propagation of a balanced, indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is made. This demonstration must show that the alternative effluent limitation desired by the discharger, considering the cumulative impact of its thermal discharge together with all other significant impacts on the species affected, will assure the protection and propagation of a balanced indigenous community of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made.*”

The Central Valley Water Board, after consideration of the Discharger’s temperature studies conducted in 2010, 2013, and 2015, and coordination with the fishery agencies, grants the following exceptions to the Thermal Plan:

- **Thermal Plan Objective 5.A.(1)a Exception:**

The maximum temperature of the discharge shall not exceed the natural receiving water temperature by more than:

25° F from 1 October through 30 April;

No exception to Thermal Plan Objective 5.A.(1)a is proposed from 1 May through 30 September.

- **Thermal Plan Objective 5.A.(1)b Exception:**

If the natural receiving water temperature is less than 65°F, the discharge shall not create a zone, defined by water temperature of more than 2°F above natural temperature, which exceeds 25 percent of the cross sectional area of the River at any point outside the zone of initial dilution.

If the natural receiving water temperature is 65°F or greater, no exception to Thermal Plan Objective 5.A.(1)b is proposed.

The Thermal Plan, however, requires that the State Water Board concur with any exceptions prior to them becoming effective. On 14 January 2016, Central Valley Water Board staff provided technical justification for the Thermal Plan exceptions to the State Water Board for their review. On 11 March 2016, State Water Board staff agreed there was adequate support for the exceptions and following adoption of this Order by the Central Valley Water Board will recommend concurrence by the State Water Board for the Thermal Plan exceptions.

3. Characterization of the Thermal Plume and Science-based Findings

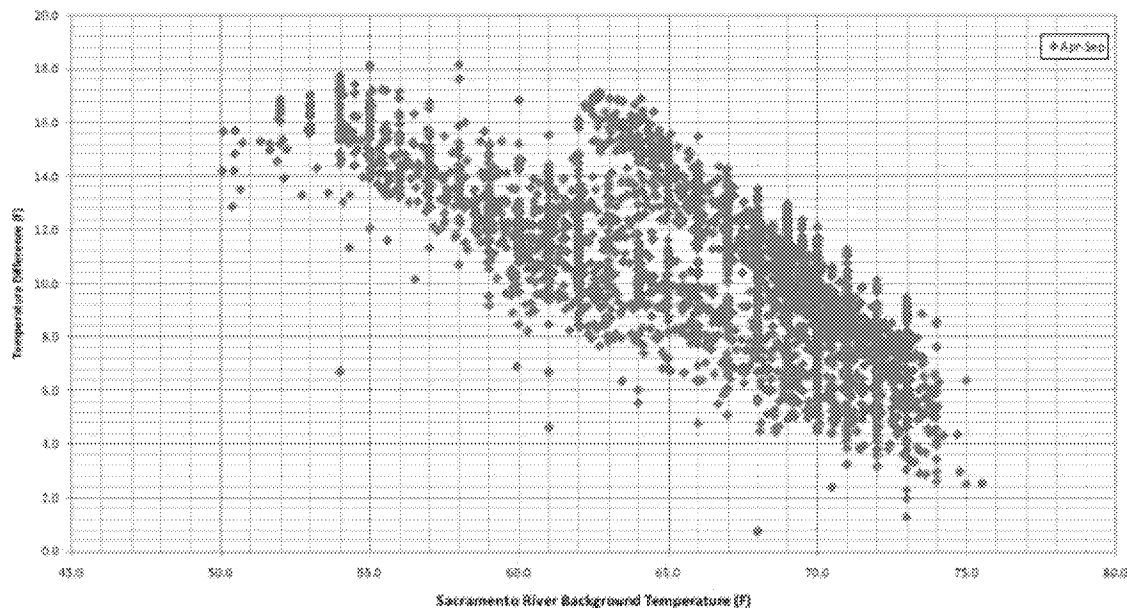
- **Continued exceptions would allow minor and transient exceedance of thermal plan objectives within a small zone.**

The exception to Thermal Plan objective 5.A.(1)a¹ would mostly be needed during three months of the year when river temperatures are below 65°F. The Discharger’s evaluation of effluent and Sacramento River temperature data from 1993 to 2010 are shown in the figures

¹ The maximum temperature shall not exceed the natural receiving water temperature by more than 20°F.

below. The Discharger has historically complied with Thermal Plan objective 5.A.(1)a April through September annually as shown in Figure I-2a.¹

Figure I-2a. Daily Average Effluent –River Temperature Differences vs. Daily Average Sacramento River Background Temperatures (April –September 1993-2010)

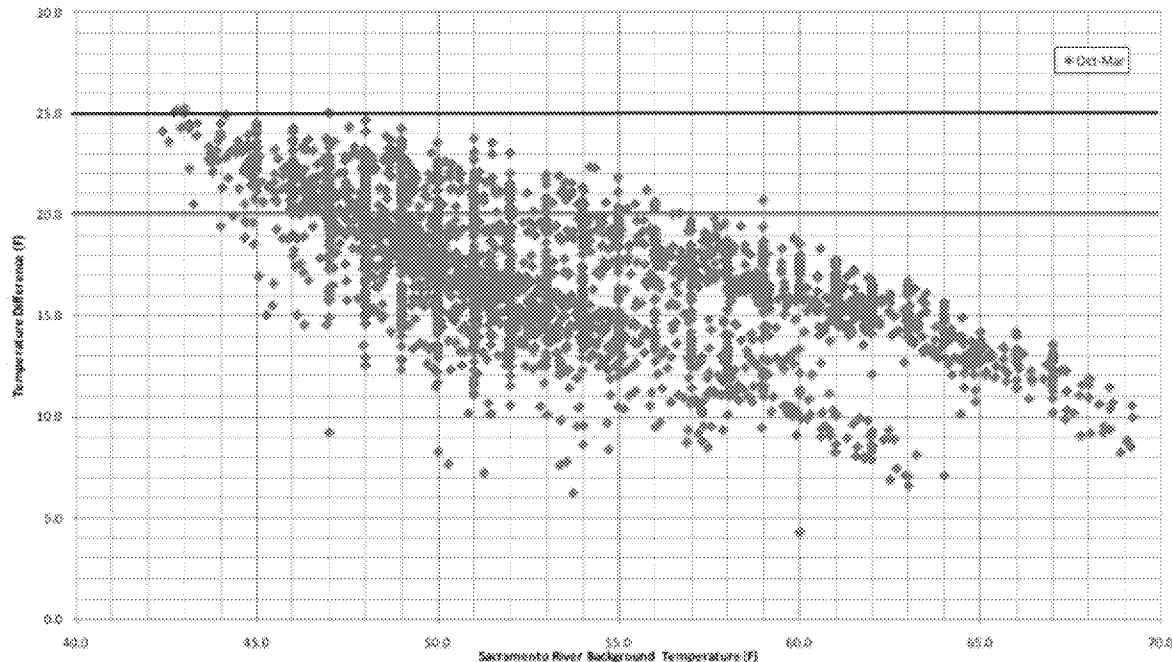


The period during which an exception to Thermal Plan objective 5.A.(1)a is needed is primarily October through March, with the greatest need occurring when the river temperature drops below 65°F (typically during November through January) as shown in Figure I-2b.² The thermal plume quickly assimilates in the receiving water so the area of thermal impact is small. It is only within a portion of the plume near the bottom of the channel where the temperature differential required under Thermal Plan Objective 5.A. (1)a (i.e., 20°F temperature differential) is not always met. Even there, the 20°F differential is always met beyond about 10-20 feet downstream of the diffuser under typical flow conditions (i.e., 46:1) and beyond about 35-70 feet downstream of the diffuser during worst case flow conditions (i.e., 14:1). Graphical depictions of the impact area can be seen in Figures I-3a, I-3b, I-4a, and I-4b, below.

¹ 2010 study, Appendix B, Attachment A

² 2010 study, Appendix B, Attachment A

Figure 2b. Daily Average Effluent –River Temperature Differences vs. Daily Average Sacramento River Background Temperatures (October –March 1993-2010)



- **There are no demonstrable negative impacts to aquatic organisms when considering population level or local level impacts.**

Key findings from the temperature studies indicate that fish, invertebrates, and algae that swim or drift past the SRWTP diffuser under current permitted discharge conditions would not experience thermal exposures that would be lethal nor would they experience thermal exposures that would cause sub-lethal adverse thermal effects. The primary reasons for these findings are that: 1) organisms drifting or swimming through the warmest portion of the plume have exposure to elevated temperatures that are sufficiently short in duration in all cases that organism-specific acute thermal tolerances are not exceeded, 2) the highest temperatures always exist immediately adjacent to the diffuser ports and are very rapidly attenuated with distance downstream due to rapid effluent mixing with river water, and 3) adult and juvenile fishes that are strong swimmers can avoid thermal exposures that they do not prefer.

Thermal exposures in the near-field plume area and far-field downstream areas do not exceed lethal or sub-lethal effect thresholds for aquatic life. Fishes do not hold within the plume area for sufficient periods of time to experience thermal induced toxicity.

- **There are sufficient zones of passage and no impairment of fish migration.**

Near-Field Thermal Plume Modeling

Thermal Plan Objective 5.A.(1)b requires that, *“Elevated temperature waste discharges either individually or combined with other discharges shall not create a zone, defined by water temperatures of more than 1°F above natural receiving water temperature, which exceeds 25 percent of the cross-sectional area of a main river channel at any point.”* The purpose of restricting the cross-sectional area of elevated temperatures is to ensure an adequate zone of passage for fishes, particularly migratory fishes. The only way to truly evaluate compliance with this objective is through modeling. Based on the Discharger’s water quality model, the requested exception to 5.A.(1)b would be necessary when the ambient receiving water temperature is less than 65°F, which typically occurs from October to early May. The Discharger has argued that, “This objective is more stringent than necessary to assure fish passage and to protect aquatic resources. In fact, the river channel temperature, unaffected by the discharge, typically varies by 1°F or more both diurnally and spatially (i.e., right bank to left bank, and top to bottom).”

Based on modeling and dye studies there are adequate zones of passage on either side and above the diffuser. The Sacramento River at the point of discharge is a channelized river with a width of 600 feet at the surface and 400 feet at the bottom. The river at high tide is approximately 20-25 feet deep. Under all near-field conditions modeled, a zone of passage approximately 75-100 feet wide occurs along the west bank and 175-200 feet wide occurs along the east bank. Furthermore, the warmest part of the thermal plume is located close to the bottom of the river so a zone of passage also exists above the plume. Actively swimming fishes can readily avoid unfavorable temperatures within the plume by swimming around or over the portions of the plume. Therefore, a thermally tolerable zone of passage exists for all actively swimming fish species that pass the diffuser and the thermal plume would not cause lethality to migrating fishes or have adverse population- or community-level effects to the anadromous or resident fishes. For details regarding the zones of passage see the 2010 study, pages 32-34.

The zones of passage can be seen in the following figures. The thermal plumes were illustrated through two-dimensional, color graphics. These graphics were developed for the 218 mgd build-out discharge scenario with a maximum temperature differential of 25°F, for the worst-case flow ratio of 14:1 and the typical flow condition of 46:1. At the time the 2010 study was developed the Discharger was seeking increased capacity to 218 mgd, but subsequently concluded that the increase was not necessary. This Order only allows a flow of 181 mgd. Therefore, the 2010 model results overstate the thermal effects of the permitted discharge. However, as shown in the graphics below, even under this conservative approach zones of passage exist.

The graphics show a centerline longitudinal profile and plan-view of temperature conditions downstream from the diffuser to 700 feet (Figures I-3a and I-3b), and river cross-section views at 60 feet, 175 feet, and 700 feet downstream of the diffuser (Figures I-4a and I-4b). These figures show zones of passage on either side of the diffuser and above the diffuser. The figures also demonstrate that under typical flow conditions the thermal plume is very small, and that even under worst-case conditions, the thermal plume quickly assimilates in the receiving water.